UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/004,095	12/03/2001	Mohammed N. Islam	068069.0114	9318

7590 02/22/2006

Douglas M. Kubehl, Esq.
Baker Botts L.L.P.
Suite 600
2001 Ross Avenue
Dallas, TX 75201-2980

EXAMINER	
LEE, DAVID J	
ART UNIT	**PAPER NUMBER**
2633	

DATE MAILED: 02/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/004,095	ISLAM, MOHAMMED N.	
	Examiner	Art Unit	
	David Lee	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 December 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,15-17,23-34,37-71,73-77,85 and 89-116* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,15-17,23-34,37-71,73-77,85 and 89-116* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 38-42, 64-70, 101, and 110-113 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 38 recites "the plurality of optical transmitters." Although antecedent basis seems to exist for the "optical transmitters" in this limitation, it is unclear as to what "the plurality of optical transmitters" refers to. It is indefinite because "the plurality of optical transmitters" could refer to the plurality of optical transmitters in the second line card, the plurality of optical transmitters in the first line card, or the plurality in all the line cards. Therefore, this limitation fails to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Correction or clarification is needed. Similar arguments pertain to claims 40 and 41.

Claim 64 recites the limitation "the receiver associated with the one of the line cards." There is insufficient antecedent basis for this limitation in the claim.

Claims 67 and 79 recite the limitation "the associated output link" and "the optical output link" respectively. There is insufficient antecedent basis for these limitations in the claims.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-4, 17, 23-25, 27, 28, 32-34, 43, 49-50, 53, 55, 56, 71, 73, 74, 85, 89, 92, 93, 96-99, 102, 103, 105, 106, 108, 114, and 116 are rejected under 35 U.S.C. 102(b) as being anticipated by Arthurs et al. (US Patent No. 5,005,167).

Regarding claims 1, 32, 43, 49, and 71, Arthurs teaches a communication system comprising: one or more line cards each operable to receive at least one packet comprising an identifier associated with at least one of a plurality of destination elements (12-1 of fig. 1), each line card comprising control circuitry operable to generate a control signal (fig. 8); one or more optical transmitters each associated with one of the one or more line cards and operable to generate at a specified wavelength an optical signal comprising at least a portion of the at least one packet received by the line card associated with that optical transmitter and at least a portion of the control signal from the control circuitry of the line card associated with that optical transmitter (22 of fig. 8); and a receiver associated with one of the one or more line cards and operable to receive an upstream optical signal from the plurality of destination elements (signal 18-1 of fig. 1 is received at a remote receiver); a star communicating fabric operable to receive the optical signals from one or more optical transmitters and to communicate to each of the plurality of destination elements a substantially similar set of at least some of the optical signals (20 of fig. 1); wherein each of the plurality of destination elements comprise a filter (26 of fig. 9) coupled to a destination receiver (26, 144 of fig. 9) and a destination transmitter (148 of fig. 9),

the destination receiver operable to receive at least a fraction of the optical signals, the destination elements operable to, based at least in part on the control signal (31 of fig. 9), perform an operation to generate the upstream optical signal that is transmitted by the destination transmitter, the destination elements coupled to the star communicating fabric (see fig. 1 – the destination elements are indirectly coupled to star fabric), which communicates at least a fraction of the upstream optical signal to the receiver associated with the one of the line cards (fig. 9 – laser 148 communicates signals via 18 to a remote receiver).

Regarding claim 2, Arthurs teaches that the optical transmitters comprises a fixed wavelength optical transmitter (22-1 of fig. 1).

Regarding claim 3, Arthurs teaches that the use of fixed wavelength optical transmitters comprises a primary mechanism for reducing collisions within the communicating fabric (col. 3, lines 4-21).

Regarding claim 4, Arthurs teaches that the filter is a tunable filter (26 of fig. 1).

Regarding claim 17, Arthurs teaches the identifier comprises an address or a tag identifying an element external to the communication system to which information in the packet is destined (col. 3, lines 23-40).

Regarding claim 23, Arthurs teaches that the communication system is operable to facilitate multicast or broadcast operation by tuning multiple of the filters to the same selected wavelength (col. 3, lines 23-40).

Regarding claim 24, Arthurs teaches an optical-to-electrical converter coupled to the filter and operable to facilitate electronic processing of the optical signal received from the filter (144 of fig. 9).

Regarding claim 25, Arthurs teaches a signal divider operable to receive a multiple wavelength signal and to communicate the multiple wavelength signal to a plurality of output paths from the star communicating fabric (21 of fig. 1: a star coupler divides the power of a combined signal, thereby replicating the combined signal to a plurality of outputs; see also col. 2, lines 54-60).

Regarding claim 27, Arthurs teaches that the signal divider comprises a power divider (star couplers divide the power of a signal; see also col. 2, lines 54-60).

Regarding claim 28, Arthurs teaches that the communicating fabric comprises a signal combiner operable to combine a plurality of wavelength signals into the multiple wavelength signal and to communicate the multiple wavelength signal to the signal divider (star couplers combine at least 2 inputs and power splits the combined signal into at least two identical signals).

Regarding claim 33, Arthurs teaches that the optical transmitters comprises a fixed wavelength optical transmitter (22-1 of fig. 1).

Regarding claim 34, Arthurs teaches that the optical transmitter comprises an integrated modulator (fig. 8).

Regarding claim 50, Arthurs teaches that the optical transmitters comprises a fixed wavelength optical transmitter (22-1 of fig. 1).

Regarding claim 53, Arthurs teaches a signal divider operable to receive a multiple wavelength signal and to communicate the multiple wavelength signal to a plurality of output paths from the star communicating fabric (21 of fig. 1: a star coupler divides the power of a combined signal, thereby replicating the combined signal to a plurality of outputs; see also col. 2,

Regarding claim 55, Arthurs teaches that the signal divider comprises a power divider (star couplers divide the power of a signal; see also col. 2, lines 54-60).

Regarding claim 56, Arthurs teaches that the communicating fabric comprises a signal combiner operable to combine a plurality of wavelength signals into the multiple wavelength signal and to communicate the multiple wavelength signal to the signal divider (star couplers combine at least 2 inputs and power splits the combined signal into at least two identical signals).

Regarding claim 73, Arthurs teaches generating a first optical signal comprising the first packet using a fixed wavelength optical transmitter operable to generate optical signals at approximately the first wavelength (22-1 of fig. 1).

Regarding claim 74, Arthurs teaches that the control circuitry and the fixed optical transmitter reside on the first line card (fig. 8 can be considered a line card).

Regarding claim 85, Arthurs teaches communicating the first packet from the first line card to the selected filter without converting the first packet from an optical to an electrical format between the first line card and the selected filter (see fig. 1: laser transmitter 22-1 to filter 26-1 is all-optical).

Regarding claim 89, Arthurs teaches that the upstream optical signal from the plurality of destination elements is at a different wavelength than the specified wavelength (the operation of the communication system in fig. 1 is capable of having the wavelength of the upstream signal be different than the wavelength of the optical signal; e.g. – a signal from 22-1 at λ_1 can exit at 14-3 at another wavelength).

Regarding claim 92, Arthurs teaches that the one or more optical transmitters are further coupled to a wavelength division multiplexer or demultiplexer (col. 2, lines 20-31).

Regarding claim 93, Arthurs teaches that the star communicating fabric comprises a signal divider operable to receive an optical wavelength signal and to communicate the optical wavelength signal to a plurality of output paths from the star communicating fabric.

Regarding claim 96, Arthurs teaches a scheduler (col. 3, lines 4-21: this type of collision prevention is considered a "scheduler").

Regarding claim 97, Arthurs teaches that at least some of the plurality of destination elements are located at different physical locations (18-1 and 18-2 of fig. 1 reside at different locations).

Regarding claim 98, Arthurs teaches that the upstream optical signal is at a different wavelength than the optical signal (the operation of the communication system in fig. 1 is capable of having the wavelength of the upstream signal be different than the wavelength of the optical signal; e.g. – a signal from 22-1 at λ_1 can exit at 14-3 at another wavelength).

Regarding claim 99, Arthurs teaches that the one or more optical transmitters are further coupled to a wavelength division multiplexer or demultiplexer (col. 2, lines 20-31).

Regarding claim 102, Arthurs teaches that the upstream optical signal is at a different wavelength than the optical signal (the operation of the communication system in fig. 1 is capable of having the wavelength of the upstream signal be different than the wavelength of the optical signal; e.g. – a signal from 22-1 at λ_1 can exit at 14-3 at another wavelength).

Regarding claim 103, Arthurs teaches that the one or more optical transmitters are further coupled to a wavelength division multiplexer or demultiplexer (col. 2, lines 20-31).

Regarding claim 105, Arthurs teaches that the plurality of destination elements are remotely located from the one or more line cards (fig. 9: the destination elements and the line cards can be considered separate, and therefore remotely located from each other).

Regarding claim 106, Arthurs teaches that the upstream optical signal is at a different wavelength than the input optical signals (the operation of the communication system in fig. 1 is capable of having the wavelength of the upstream signal be different than the wavelength of the optical signal; e.g. – a signal from 22-1 at λ_1 can exit at 14-3 at another wavelength).

Regarding claim 108, Arthurs teaches that each of the plurality of destination elements are located in different location (output ports of fig. 1 are in different locations).

Regarding claim 114, Arthurs teaches that the upstream optical signal is at a different wavelength than the first wavelength (the operation of the communication system in fig. 1 is capable of having the wavelength of the upstream signal be different than the wavelength of the optical signal; e.g. – a signal from 22-1 at λ_1 can exit at 14-3 at another wavelength).

Regarding claim 116, Arthurs teaches that the one or more line cards are located at a different location than the one or more destination elements (fig. 9: the destination elements and the line cards can be considered separate, and therefore remotely located from each other).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 15, 38-41, 44, 45, 47, 51, 64, 67-70, 76, 90, 91, 101, 110, 111, and 113 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arthurs.

Regarding claim 38, Arthurs teaches a communication system comprising: a first plurality of line cards residing in a first location (left side of star coupler in fig. 1); a second plurality of line cards residing in one or more other locations physically separate from the first location (right side of star coupler in fig. 1), wherein each of the line cards of the second pluralities of line cards comprises a filter (26 of fig. 9) coupled to a receiver (26, 144 of fig. 9) and an optical transmitter operable to generate at a specified wavelength an optical signal (148 of fig. 9); a star communicating fabric (20 of fig. 1) operable to receive a plurality of optical signals from the plurality of optical transmitters ("the plurality of transmitters" is considered to be 12-N from the first plurality of line cards) and to communicate substantially similar sets of optical signals to each of a plurality of filters (26 of fig. 9); wherein the star communicating fabric operates as an interconnect between the different locations of line cards (fabric 20 interconnects the line cards) and wherein the communication system is operable to communicate an optical signal from an optical transmitter residing in the first location to a filter residing in the one or more other locations without converting the optical signal to an electronic form between the optical transmitter and the filter (see fig. 1: laser transmitter 22-1 to filter 26-1 is all-optical); and wherein the first plurality of line cards further comprise a control circuitry operable to generate a control signal (fig. 8), and wherein the optical transmitters associated with the first plurality of line cards communicate the control signal as at least a part of the optical signal to the second plurality of line cards, and wherein the second plurality of line cards perform a function based at least in part on the control signal received (fig. 9). Arthurs also discloses that each of the first

pluralities of line cards comprises a receiver (121 of fig. 8) and an optical transmitter (22 of fig. 8) operable to generate at a specified wavelength an optical signal, but fails to disclose that a filter is coupled to the receiver and the transmitter. However, it is common in the art to filter out noise and other undesired frequencies prior to converting an optical signal into an electrical signal. Examiner takes official notice that this is well known and widely done throughout the art. It would have been obvious to a skilled artisan at the time of invention to include a filter on link 16 (of fig. 8) prior to the O/E conversion in order to filter out any detrimental or undesired wavelengths, so as to improve transmission quality and to increase the signal-to-noise ratio of the incoming signals.

Regarding claim 39, Arthurs teaches that the optical transmitters comprises a fixed wavelength optical transmitter (22-1 of fig. 1).

Regarding claim 40, Arthurs teaches that at least one of the plurality of filters is a tunable filter (26 of fig. 1).

Regarding claim 41, Arthurs teaches that each of the plurality of filters is a tunable filter (26-N of fig. 1).

Regarding claim 44, Arthurs teaches that the optical transmitters comprises a fixed wavelength optical transmitter (22-1 of fig. 1).

Regarding claim 45, Arthurs teaches that at least one of the one or more optical transmitters resides externally to its associated line card (fig. 1: 12-1 can be considered a line card and 22-1 can be considered the transmitter).

Regarding claim 101, Arthurs teaches the limitations of claim 38, but does not expressly disclose that the signal divider comprises a cascade of 1xn optical couplers. However, the use of

cascaded optical couplers in star topology networks is well known in the art, as illustrated by Suchoski (fig. 3). It would have been obvious to one of ordinary skill in the art at the time of invention to use cascaded optical couplers in order to divide the signal in the appropriate amount of outputs.

Regarding claims 90 and 91, Arthurs teaches limitations of claim 1 but does not expressly disclose a Raman amplifier. Examiner takes official notice that is common and well known to incorporate a Raman amplifier into an optical transmission system. It would have been obvious to a skilled artisan at the time of invention to do so in order to provide healthy signals.

Regarding claims 15, 47, 51, and 76, Arthurs teaches the limitations of the previous claims but does not expressly disclose that the packet comprises a Transmission Control Protocol (TCP) packet. Examiner takes official notice that the use of TCP in an optical packet switching system is well known and widely used in the art. A skilled artisan would have been motivated to implement TCP in a system for multiple reasons. With TCP, end-to-end virtual connections, which set parameters for transferring data without assigning physical network channels, are established between subscribers. With this type of operation, TCP is implemented in the end stations, but not seen by the network itself. This allocation of functions simplifies processing within the network and facilitates interfacing between heterogeneous networks. Furthermore, other advantages associated with TCP include the ability to have variable size packets, less operating systems interrupts, fast routing for data calls, and error control for efficient and accurate transmission. It would have been obvious to a skilled artisan at the time of invention to implement TCP in the system of Arthurs in order to take advantage of the benefits above so as to improve overall system performance.

Regarding claim 64, in view of the 112 rejection above, Arthurs teaches a communication system, comprising: one or more line cards each operable to receive at least one packet (along input fiber 16 of fig. 8), each line card operable to perform header or label processing to facilitate communicating the received packet toward one or more destination elements (col. 3, lines 23-40), and each line card further comprising a control circuitry capable of generating a control signal (fig. 8); one or more optical transmitters each associated with one of the line cards and operable to generate at a particular wavelength an optical signal comprising at least a portion of the packet received by the line card associated with that optical transmitter and further comprising the control signal from the control circuitry (22 of fig. 8); and a star communicating fabric (20 of fig. 1) operable to receive one or more optical signals from the one or more optical transmitters and to communicate a substantially similar set of optical signals to each of one or more destination elements (right side of the system of fig. 1), wherein each of the one or more destination elements comprises a filter (26 of fig. 9) coupled to a destination receiver (26, 144 of fig. 9) and a destination transmitter (148 of fig. 9), the destination receiver operable to receive at least a fraction of the optical signals, the destination elements operable to, based at least in part on the control signal perform an operation to generate the upstream optical signal that is transmitted by the destination transmitter (28 of fig. 9), the destination elements coupled to the star communicating fabric, which communicates at least a fraction of the upstream optical signal to a receiver. Arthurs does not expressly disclose that the packet comprises a Transmission Control Protocol (TCP) packet. Examiner takes official notice that the use of TCP in an optical packet switching system is well known and widely used in the art. A skilled artisan would have been motivated to implement TCP in a system for multiple reasons. With TCP, end-to-end

virtual connections, which set parameters for transferring data without assigning physical network channels, are established between subscribers. With this type of operation, TCP is implemented in the end stations, but not seen by the network itself. This allocation of functions simplifies processing within the network and facilitates interfacing between heterogeneous networks. Furthermore, other advantages associated with TCP include the ability to have variable size packets, less operating systems interrupts, fast routing for data calls, and error control for efficient and accurate transmission. It would have been obvious to a skilled artisan at the time of invention to implement TCP in the system of Arthurs in order to take advantage of the benefits above so as to improve overall system performance.

Regarding claim 67, in view of the 112 rejection above, Arthurs teaches that at least some of the plurality of filters is a tunable filter (26 of fig. 1).

Regarding claim 68, Arthurs teaches that the optical transmitters comprises a fixed wavelength optical transmitter (22-1 of fig. 1).

Regarding claim 69, Arthurs teaches that at least one of the filters resides externally to all of the line cards (fig. 1: 26-1 can be considered separate from the line card).

Regarding claim 70, in view of the 112 rejection above, Arthurs teaches that each of the filters resides on a respective one of the one or more line cards that is coupled to the optical output link associated with that filter (fig. 1: 26-N can be considered separate from the line cards).

Regarding claim 110, Arthurs teaches that the upstream optical signal is at a different wavelength than the optical signal (the operation of the communication system in fig. 1 is

capable of having the wavelength of the upstream signal be different than the wavelength of the optical signal; e.g. – a signal from 22-1 at λ_1 can exit at 14-3 at another wavelength).

Regarding claim 111, Arthurs teaches that the one or more optical transmitters are further coupled to a wavelength division multiplexer or demultiplexer (col. 2, lines 20-31).

Regarding claim 113, Arthurs teaches that the one or more line cards are located at a different location than the one or more destination elements (fig. 9: the destination elements and the line cards can be considered separate, and therefore remotely located from each other).

7. Claims 29, 57-59, 60-62, and 95 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arthurs in view of Suchoski Jr. et al. (US Patent No. 4,953,935) and Bergmann (US Patent No. 5,140,655).

Regarding claim 58, Arthurs teaches a communicating core for use in a communication system (20 of fig. 1), the communicating core comprising: a signal combiner operable to combine a plurality of wavelength signals into a multiple wavelength signal (the star coupler combines at least 2 inputs and splits it into at least two identical signals); a control circuitry operable to generate a control signal that is combined with at least a portion of the multiple wavelength signal (fig. 8); a signal divider (the star coupler divides the power of a combined signal, thereby replicating and transmitting the combined signal to a plurality of outputs; see also col. 2, lines 54-60) operable to receive a multiple wavelength signal and to communicate the multiple wavelength signal toward a plurality filters (26-N of fig. 1), each filter associated with an output link from the communication system and operable to separate the multiple wavelength signal into a plurality of output wavelength signals (fig. 9); at least some of the output

wavelength signals coupled to one or more receivers, wherein the receivers perform a function at the output link based at least in part on the control signal from the control circuitry (note link 31 of fig. 9). Suchoski Jr. illustrates the star coupler in more detail, which similar in function to that of Arthurs' (figs. 2 and 4). A skilled artisan at the time of invention would have clearly recognized that the star coupler Arthurs would have performed similarly to the star coupler of Suchoski.

Arthurs does not expressly an optical amplifier operable to receive and amplify at least a fraction of the multiple wavelength signal. However, the use of amplifiers in star couplers is well known in the art. For example, Bergmann, from a similar field of endeavor, discloses an optical star coupler utilizing fiber amplifier technology (76 of fig. 6). It would have been obvious to a skilled artisan at the time of invention to amplify the signal in order to compensate for the loss caused from dividing the signal.

Regarding claim 59, Bergmann teaches a WDM to combine the signals (74 of fig. 6).

Regarding claim 60, Arthurs teaches the limitations above, but does not expressly disclose that the signal divider comprises a cascade of 1xn optical couplers. However, the use of cascaded optical couplers in star topology networks is well known in the art, as illustrated by Suchoski (fig. 3). It would have been obvious to one of ordinary skill in the art at the time of invention to use cascaded optical couplers in order to divide the signal in the appropriate amount of outputs.

Regarding claim 61, Arthurs teaches that the signal divider comprises a power divider (star couplers divide the power of a signal; see also col. 2, lines 54-60).

Regarding claim 62, Arthurs teaches that at least some of the filters comprise tunable filters operable to select a portion of the multiple wavelength signal for further transmission by tuning to a wavelength of the selected portion of the multiple wavelength signal (28 of fig. 9).

Regarding claims 29, 57, and 95, Arthurs teaches the limitations of claims 25, 53, 93, but does not expressly an optical amplifier operable to receive and amplify at least a fraction of the multiple wavelength signal. However, the use of amplifiers in star couplers is well known in the art. For example, Bergmann, from a similar field of endeavor, discloses an optical star coupler utilizing fiber amplifier technology (76 of fig. 6). It would have been obvious to a skilled artisan at the time of invention to amplify the signal in order to compensate for the loss caused from dividing the signal.

8. Claim 63 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arthurs in view of Suchoski Jr. and Bergmann and in further view of Arthurs et al. (US Patent No. 4,873,681, hereinafter referred to as "Arthurs '681").

Regarding claim 63, the combined invention of Arthurs and Bergmann teaches the limitations of claim 58 but does not disclose that the signals are generated by tunable optical transmitters. However the use of tunable optical transmitters is well known in the art. For example, Arthurs '681 teaches the use of tunable optical transmitters in a switching core (45-N of fig. 1). It would have been obvious to a skilled artisan at the time of invention to use a tunable transmitter in order to have more flexibility in wavelength transmission so as to increase transmission efficiency by traffic/wavelength reallocation.

9. Claim 65 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arthurs in view of Arthurs '681.

Regarding claim 65, Arthurs teaches the limitations of claim 64 but does not disclose that the signals are generated by tunable optical transmitters. However the use of tunable optical transmitters is well known in the art. For example, Arthurs '681 teaches the use of tunable optical transmitters in a switching core (45-N of fig. 1). It would have been obvious to a skilled artisan at the time of invention to use a tunable transmitter in order to have more flexibility in wavelength transmission so as to increase transmission efficiency by traffic/wavelength reallocation.

10. Claims 16, 48, 52 and 77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arthurs in view of O'Connor (US Pub. No. 2002/0085543 A1).

Regarding claims 16, 48, 52, and 77, Arthurs teaches the limitations of claims 1, 43, 49 and 71 but does not expressly disclose that the packet comprises a MPLS packet. However, MPLS is an advanced routing technique well known in the art. For example, O'Connor teaches an advanced IP/SONET system wherein regular packets are converted into an MPLS format at edge nodes (paragraph 0008). A skilled artisan would have been motivated to use MPLS packets in order to reduce the amount of state information that needs to be maintained by a network, to determine the physical path through a network, to identify the quality of service requirements of paths through the network and to provide multiple paths through access networks. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use MPLS packets as taught by O'Connor.

11. Claims 26, 54, 94, 100, 104, 107, 109, 112, and 115 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arthurs in view of Suchoski, Jr.

Regarding claims 26, 54, 94, 100, 104, 107, 109, 112, and 115, Arthurs teaches the limitations above, but does not expressly disclose that the signal divider comprises a cascade of 1xn optical couplers. However, the use of cascaded optical couplers in star topology networks is well known in the art, as illustrated by Suchoski (fig. 3). It would have been obvious to one of ordinary skill in the art at the time of invention to use cascaded optical couplers in order to divide the signal in the appropriate amount of outputs.

12. Claims 30, 31, 37, 42, 46, 66, and 75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arthurs in view of Knox et al. (US Patent No. 5,631,758).

Regarding claims 30, 37, 42, 46, 66, and 75, Arthurs does not expressly disclose that at least some of the plurality of optical transmitters each comprise: a modulator operable to receive from common bay equipment an unmodulated optical signal having a center wavelength and to modulate the received signal; wherein the common bay equipment is operable to generate using a single optical source a plurality of unmodulated optical signals each having a center wavelength. However, Knox teaches a modulator (207 of fig. 2) operable to receive from common bay equipment an unmodulated optical signal (from 201 of fig. 2) having a center wavelength (fig. 1a) and to modulate the received signal; wherein the common bay equipment is operable to generate using a single optical source a plurality of unmodulated optical signals each having a center wavelength ($\lambda 1 - \lambda n$ of fig. 2; see also figs. 1a and 1b). It would have been obvious to

one of ordinary skill in the art at the time of invention to incorporate in at least some of the transmitters a modulator operable to receive from common bay equipment an unmodulated optical signal having a center wavelength and to modulate the received signal wherein the common bay equipment is operable to generate using a single optical source a plurality of unmodulated optical signals each having a center wavelength in order to allow additional users to transmit data in and through the router.

Regarding claim 31, the combined invention of Arthurs and Knox teaches that the common bay equipment comprises: a modelocked pulse source (201 of fig. 2) operable to generate a plurality of optical pulses (col. 4, lines 20-23); and a continuum generator operable to broaden the spectrum of the plurality of optical pulses into an approximate spectral continuum of optical pulses (col. 8, lines 33-59; also, amplification can be considered to broaden the pulse spectrum; see also figs. 12a-12f). The combined invention does not expressly disclose a signal splitter operable to generate from the approximate continuum the plurality of unmodulated optical signals each comprising a center wavelength. However, the combined invention teaches a signal splitter (211 of fig. 2) to split the signal after it has been modulated. It would have been obvious to one of ordinary skill in the art at the time of invention to split the signal before modulation and to have a plurality of modulators to modulate each split signal.

Response to Arguments

13. Applicant's arguments filed on 11/28/2005 have been fully considered but they are not persuasive. Applicant argues that Arthurs does not teach an optical signal comprising at least a portion of the at least one packet received by the line card associated with the optical transmitter

and at least a portion of the control signal from the control circuitry. However, the opposite is clearly true based on Arthurs' disclosure of the optical transmitter in Figure 8. The optical signal from laser transmitter 22 transmitted along link 24 to the star coupler comprises a portion of the received packet from the elastic buffer 123 and a portion of the control signal from the transmission control 130. It is noted also that another "portion" of the control signal is transmitted along the major track 31. Applicant is also reminded that although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. Furthermore, applicant's arguments do not comply with 37 CFR 1.111(c) because they do not clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. Further, they do not show how the amendments avoid such references or objections.

14. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Lee whose telephone number is (571) 272-2220. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DL

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER